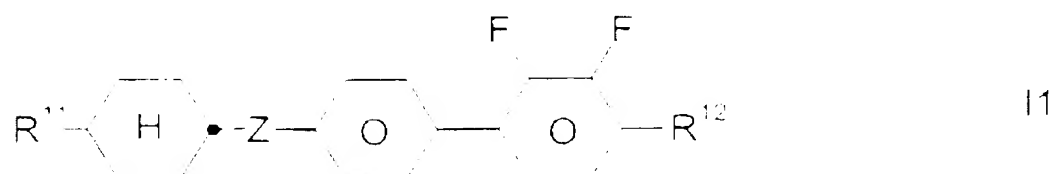


—

[illegible]

the KX effect and the HX effect in plane switching displays.

The principle of electrically controlled switching in the KX effect is essentially the same as that of the HX effect. It was described for the first time in 1971 (M.M. Shapoval and N. Kamenchen, "Information in liquid crystals with external magnetic field" Appl. Phys. Lett. 18, 1971, 1972). This was followed by papers by J.M. Farn (Appl. Phys. Lett. 20, 1972, 1973) and A. Lohman and J. F. Hart (Appl. Phys. 14, 1973, 1974).

The papers by J. Farn and N. Lohman (SID 81 Digest Techn. Papers, 1981, 1982) and A. Lohman (Displays '81, 1981, 1982) and H. Schol (SID 82 Digest Techn. Papers, 1982, 1983) have shown that liquid crystalline phases must have high values for the ratio between the elastic constants K_1 , high values for the optical anisotropy Δn and values for the dielectric anisotropy $\Delta\epsilon$ of from 10^3 to 10^4 in order to be suitable for high information display elements based on the KX effect. Electrically induced display elements based on the HX effect have a number of advantages. Universally negative liquid crystal media can also be used in displays utilizing the so-called HX effect.

Technical use of the effect in electrically induced display elements requires 18 phases with high optical anisotropy and high dielectric anisotropy. Liquid crystal phases with these properties are not available in the form of liquid crystals. However, the required properties can be achieved in the form of nematic and smectic liquid crystals and liquid crystalline polymers.

Technical use of the effect in electrically induced display elements requires 18 phases with high optical anisotropy and high dielectric anisotropy. Liquid crystal phases with these properties are not available in the form of liquid crystals. However, the required properties can be achieved in the form of nematic and smectic liquid crystals and liquid crystalline polymers.

liquid crystal material is used as a liquid crystal phase which can be used as a liquid crystal material. However, liquid crystal material which can be used as a liquid crystal material is not necessarily available. In general, liquid crystal material is prepared in order to obtain substances which can be used as liquid phases. However, liquid phases could not be prepared easily in this way, since the liquid crystal material is not necessarily available. Therefore, liquid crystal material is not necessarily available.

Matrix type liquid crystal display is known. The liquid elements which can be used as individual switching in the individual pixels are, for example, active elements (e.g., transistors). This is then referred to as an "active matrix", and a distinction can be made between two types:

1. A liquid crystal element is a transistor on a silicon wafer as substrate.
2. Liquid crystal element is TFT on a glass plate or substrate.

In the case of type 1, the element physical effect used is usually dynamic scattering or the electro-optic effect. The use of liquid crystal material as the substrate material limits the display area, since there is a limit to the size of the liquid crystal material which can be used as a substrate material. Therefore, liquid crystal material is not necessarily available.

In the case of type 2, the element physical effect used is usually dynamic scattering or the electro-optic effect. The use of liquid crystal material as the substrate material limits the display area, since there is a limit to the size of the liquid crystal material which can be used as a substrate material. Therefore, liquid crystal material is not necessarily available.

A liquid crystal display device is known. The liquid elements which can be used as individual switching in the individual pixels are, for example, active elements (e.g., transistors). This is then referred to as an "active matrix", and a distinction can be made between two types:

typical mixture generally keeps over the life of an MLI display without degradation with the intensity sustained in the display. A more critical consideration is very important for displays which must have acceptable performance under very high temperatures.

The disadvantages of the MLI-III displays listed and inherent in the materials are comparatively low contrast, relatively small viewing angle, degradation and the difficulty of generating gray shades in these displays.

MLI-III displays based on III-V displays based on the WBP effect. However, the III-V oxides, particularly those which are based on the alkylphenyl derivatives containing an ester, ether or vinyl bridge, have low "voltage holding ratio" (H) values after UV exposure.

There thus remains to be a great demand for MLI displays which have very high sensitivity at the same time as a broad operating temperature range, short response times and a low threshold voltage which can be used to generate gray shades.

It is an object of the invention to provide MLI displays based on the WBP effect which do not have the disadvantages listed above, or only to a lesser extent, and which are easy to use and very low cost.

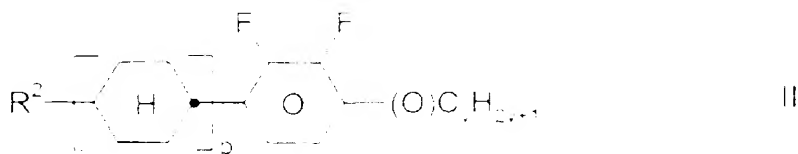
It has been found that the use of a certain type of material in the liquid crystal mixture system, or in the display, and the use of a certain type of material in the substrate, can improve the display quality.

The invention is based on the use of a certain type of material in the liquid crystal mixture system, or in the display, and the use of a certain type of material in the substrate, can improve the display quality.

The mixture according to the invention has very favorable values for the quantitative conversion, relatively high values for the yield rate, and at the same time very good temperature stability.

Some preferred embodiments are mentioned below:

- a. A medium which substantially comprises one or more compounds of the formula II:



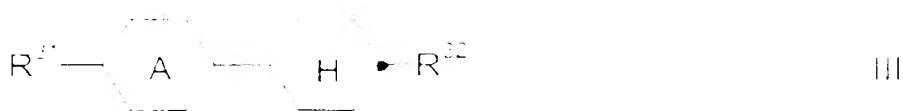
in which

R² is independently as defined for R¹, R³ and R⁴,

n is 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

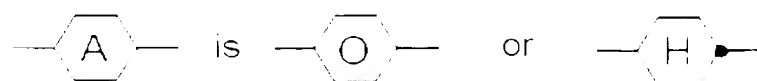
n is from 1 to 6.

- b. A medium which substantially comprises one or more compounds of the formula III:

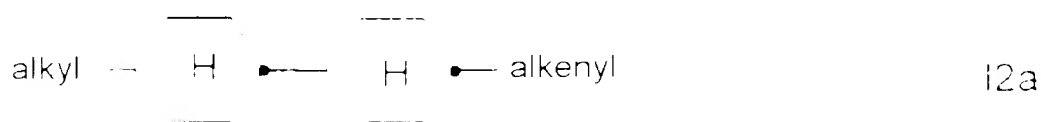


in which

R²¹ is independently as defined for R¹, R³ and R⁴,
R²² is independently as defined for R¹, R³ and R⁴,
n is from 1 to 6.



- g. A medium in which the proportion of compounds of the formula II is at least 1% by weight, preferably at least 2% by weight, of the formula II.
- h. A medium in which the proportion of compounds of the formula II is at least 1% by weight, preferably at least 2% by weight, of the formula II.
- i. A medium in which the proportion of compounds of the formula II in the total mixture is at least 1% by weight, preferably at least 2% by weight.
- j. A medium in which the proportion of compounds of the formula II in the total mixture is at least 1% by weight, preferably at least 2% by weight.
- k. A medium in which the proportion of compounds of the formula II in the total mixture is at least 1% by weight.
- l. A medium in which the proportion of compounds of the formula II in the total mixture is at least 1% by weight.
- m. A medium in which the proportion of compounds of the formula II in the total mixture is at least 1% by weight.
- n. A medium in which the proportion of compounds of the formula II in the total mixture is at least 1% by weight.



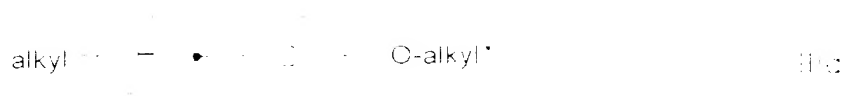
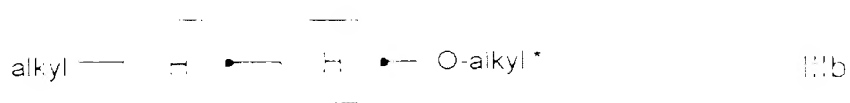
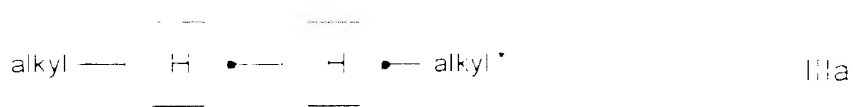


alkenyl and

alkenyl* are each, independently of one another,
a straight-chain alkenyl radical having
1 to 10 carbon atoms.

alkyl is a straight-chain alkyl radical having
1 to 10 carbon atoms.

A portion which is substantially independent of α and β and
selected from the formulae IIIa to IIId:



the group

alkyl and

alkyl* are each, independently of one another,
a straight-chain alkyl radical having 1 to 10 carbon
atoms.

The definition relating to the invention generally
applies to all of the formulae IIIa to IIId
and to formula IIIe.

It is to be understood that the invention

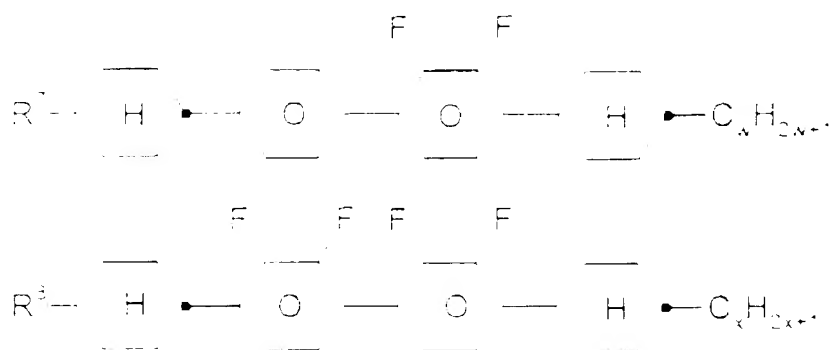
is not limited to the specific details of the
invention.

by weight of the monomers in the formula II.

and

by weight of the monomers in the formula III.

A polymer which substantially complies with the foregoing definition.

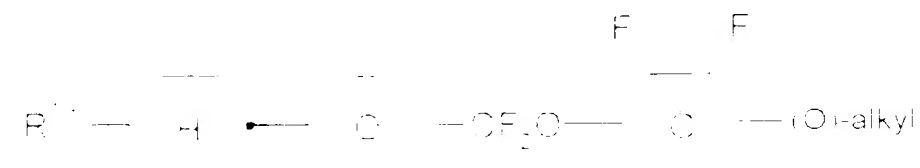
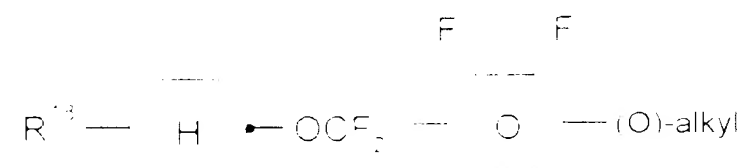
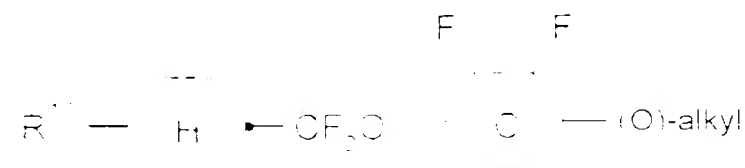
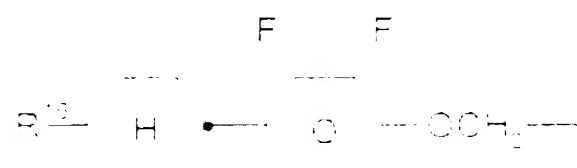
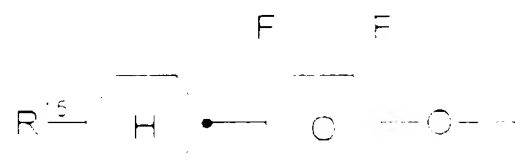
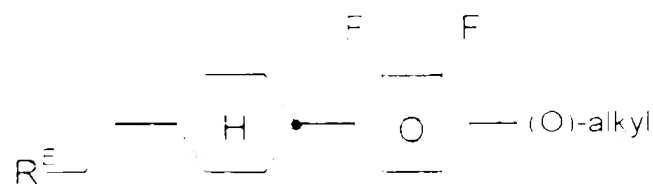
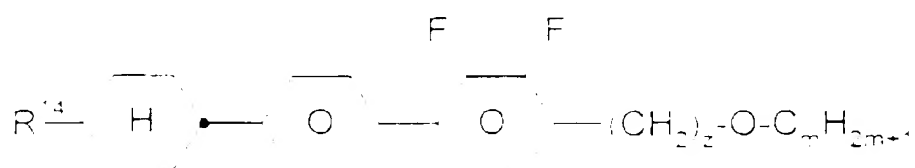
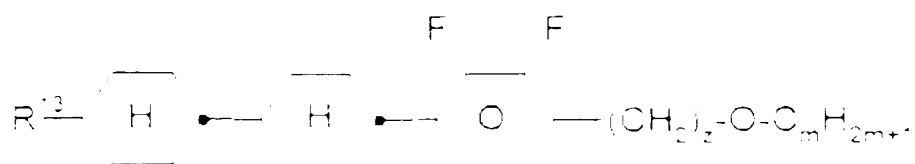


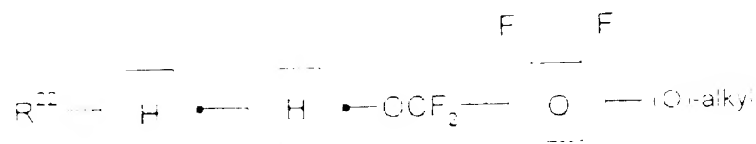
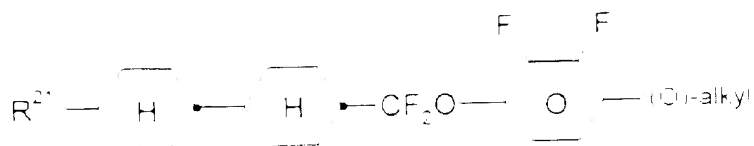
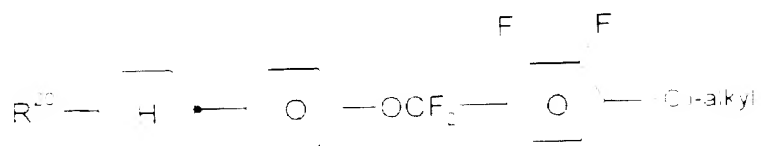
in which

R¹ and R² are each, independently, a hydrogen atom, an alkyl group, or an aryl group.

x and x' are each, independently, a number from 1 to 10.

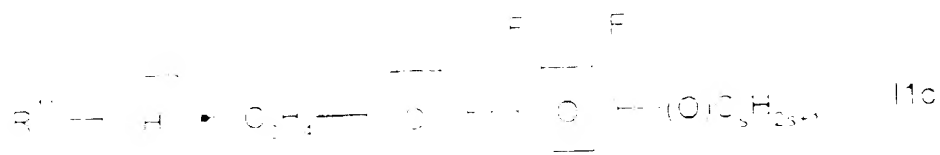
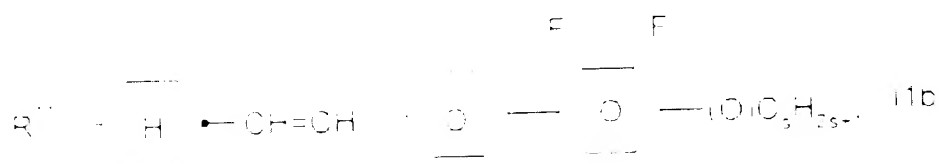
A polymer which substantially complies with the foregoing definition.

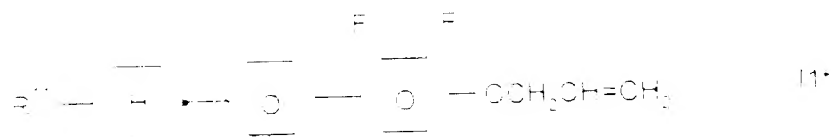
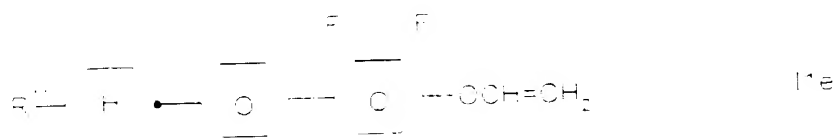




ii. which R^{20} , R^{21} and R^{22} are each, independently of one another, as defined for R^{10} , R^{11} and R^{12} , and z and n are each, independently of one another, 1-6, R is H , $-CH_3$, $-CH_2-$ or $n\text{-C}_4H_9$.

iii. A medium in which the compound of the formula II is selected from the group consisting of IIa to IIg:





in which R'' is as defined as R , and n is 1 or 2. R is preferably straight chain alkyl having 1 to 6 carbon atoms, vinyl, 1E-alkenyl or 1E-alkenyl.

3. A medium which comprises one or more compounds of the formula 11a and 11b.
4. A medium which comprises one or more compounds of the formula



in which R is vinyl, 1E-alkenyl, 1E-alkenyl or 1E-alkenyl or straight chain alkyl having 1 to 6 carbon atoms.

The present invention is directed to a medium which comprises one or more compounds of the formula 11a and 11b. The medium is particularly useful for the preparation of a medium which comprises one or more compounds of the formula 11a and 11b.

based on standard methods which are described in the literature.

The present liquid crystal mixture in the display according to the invention generally comprises two components A and B, which themselves consist of one or more individual compounds.

Component A has significantly negative dielectric anisotropy and gives the nematic phase a dielectric anisotropy $\Delta\epsilon \leq -1.5$. It preferably comprises compounds of the formulae II and III.

The proportion of component A is preferably between 45 and 100%, in particular between 60 and 100%.

For component A, one or more individual compounds having a $\Delta\epsilon \leq -1.5$ are preferably selected. The smaller the proportion of component A in the total mixture, the more negative this value must be.

Component B has pronounced nematicity and a low viscosity of not more than $2 \text{ mm}^2/\text{s}$, preferably not more than $1.5 \text{ mm}^2/\text{s}$, at 25°C . It preferably comprises compounds of the formulae II and III.

Particularly preferred individual compounds of component B are extremely low viscosity nematic liquid crystals having a low viscosity of not more than $15 \text{ mm}^2/\text{s}$, preferably not more than $10 \text{ mm}^2/\text{s}$, at 25°C .

Component B has mesotropic or enantiotropic mesogenicity, has a nematic phase and can prevent the formation of a smectic phase in liquid crystal mixtures over a very low temperature. It is, for example, a nematic liquid crystal mixture in which each compound has a high melting point and a low viscosity, the melting point of each compound being higher than the melting point of the mixture. The total viscosity of these compounds

known materials are known from the prior art disclosed in the art from the literature. Particular preference is given to compounds of the formula III.

In addition, these liquid crystal phases may also contain more than 1% components, preferably from 1% to 10% components.

The phases preferably contain from 4 to 10, in particular 5 to 10, compounds of the formulae II, III, IV and optionally III.

Besides compounds of the formulae II, III, IV and III, it is also possible for other constituents to be present, for example in an amount of up to 40% of the total mixture, but preferably up to 10%, in particular up to 5%.

The other constituents are preferably selected from nematic or nematogenic substances, in particular known substances from the classes consisting of the araxy benzenes, benzylidenes, biphenyls, biphenyls, phenyl : cyclohexyl benzenes, phenyl : cyclohexyl, cyclohexanecarboxylates, phenylcyclohexanes, cyclohexyl biphenyls, cyclohexylcyclohexanes, cyclohexyl-naphthalenes, 1,4-bis-cyclohexylbiphenyls or cyclohexyl pyridines, phenyl : cyclohexyl, nematic, specially halogenated stilbenes, diaryl ethers, ketones and substituted amides, etc.

In order to obtain the liquid crystal phases of the liquid crystal mixture of this type, one can use the following procedure:

1. Preparation of the liquid crystal mixture

The liquid crystal mixture is prepared by mixing the components of the liquid crystal mixture in the proportions specified in the following table. The liquid crystal mixture is then used in the liquid crystal phase.

It is to be understood that the disclosure is not limited to the specific examples described herein, but is intended to cover all variations and modifications that may be made by those skilled in the art. The disclosure is intended to be illustrative, and not limiting, of the invention in any way whatsoever.

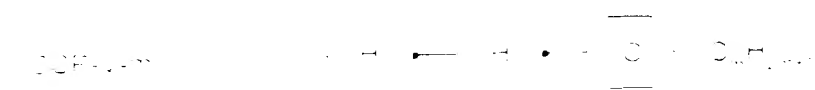
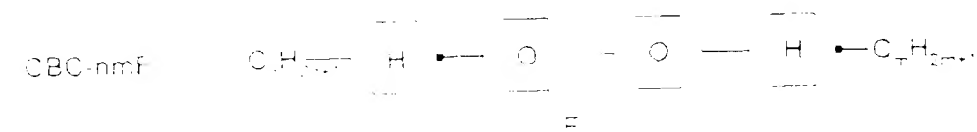
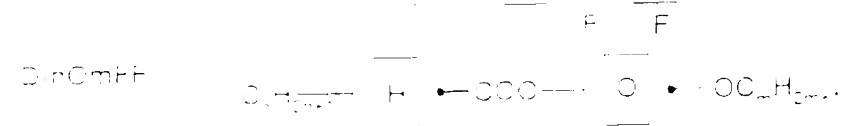
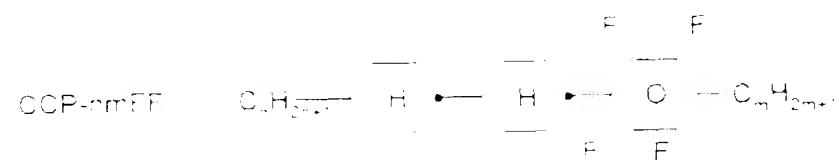
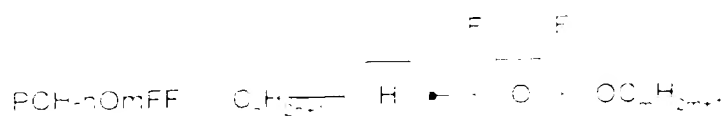
In the foregoing and in the following examples, all temperatures are set forth unconverted in degrees Celsius; and, unless otherwise indicated, all parts and percentages are by weight.

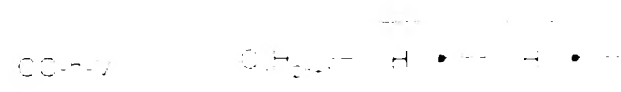
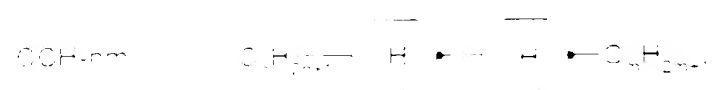
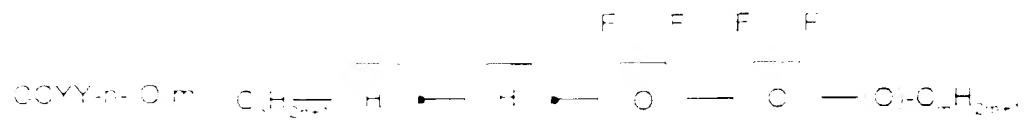
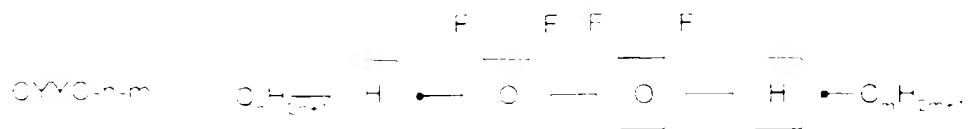
The entire disclosure of all applications, patents and publications cited above, and of corresponding German application No. DE 11, 12, 13, filed April 14, 1971, is hereby incorporated by reference.

Besides the compounds of the formulae 11 and 12, the liquid-crystal mixtures according to the invention preferably comprise one or more of the compounds recited below.

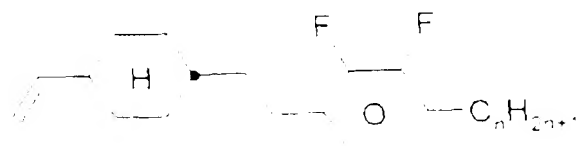
The following abbreviations are used:

13 m = 1-8; g = 1-8

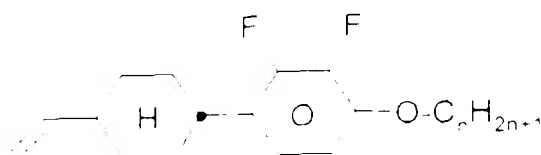




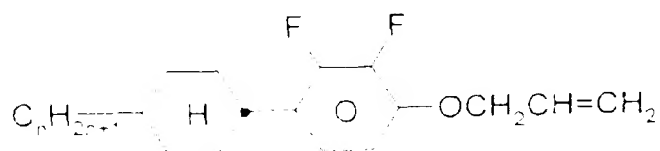
CVY-V-n



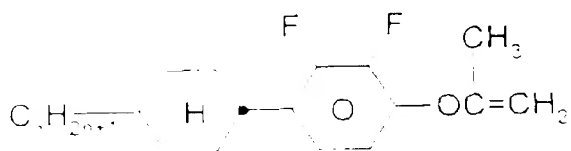
CY-V-On



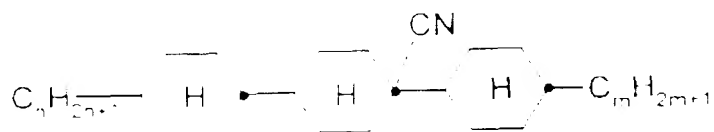
CY-n-O1V



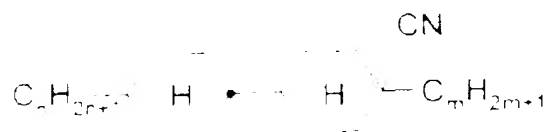
CY-n-OC(CH₃)=CH₂



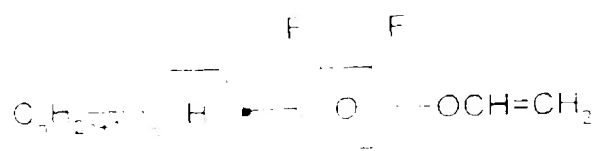
BCN-nm



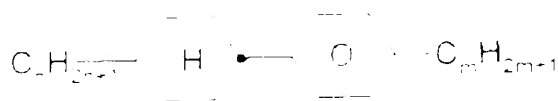
CCN-nm



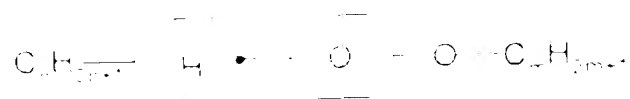
CY-n-OV



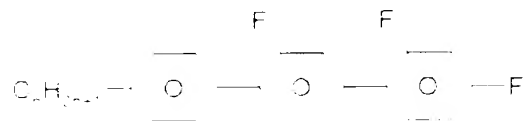
PCH-nm



PCH-nOm



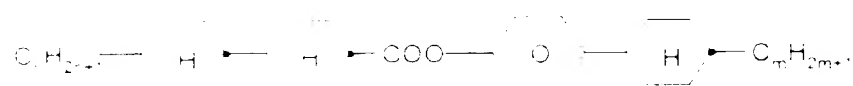
PGIGI-n-F



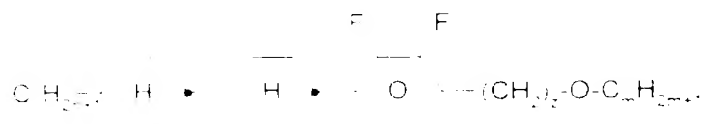
BCH-nm



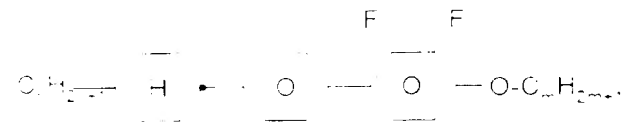
CCPC-nm



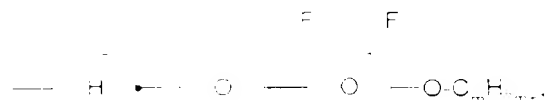
CCY-n-zOm



CPY-n-Om



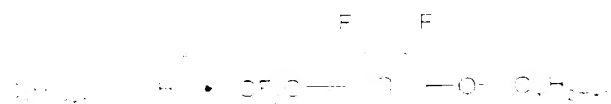
CPY-V-Om



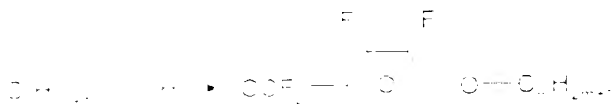
CPY-nm

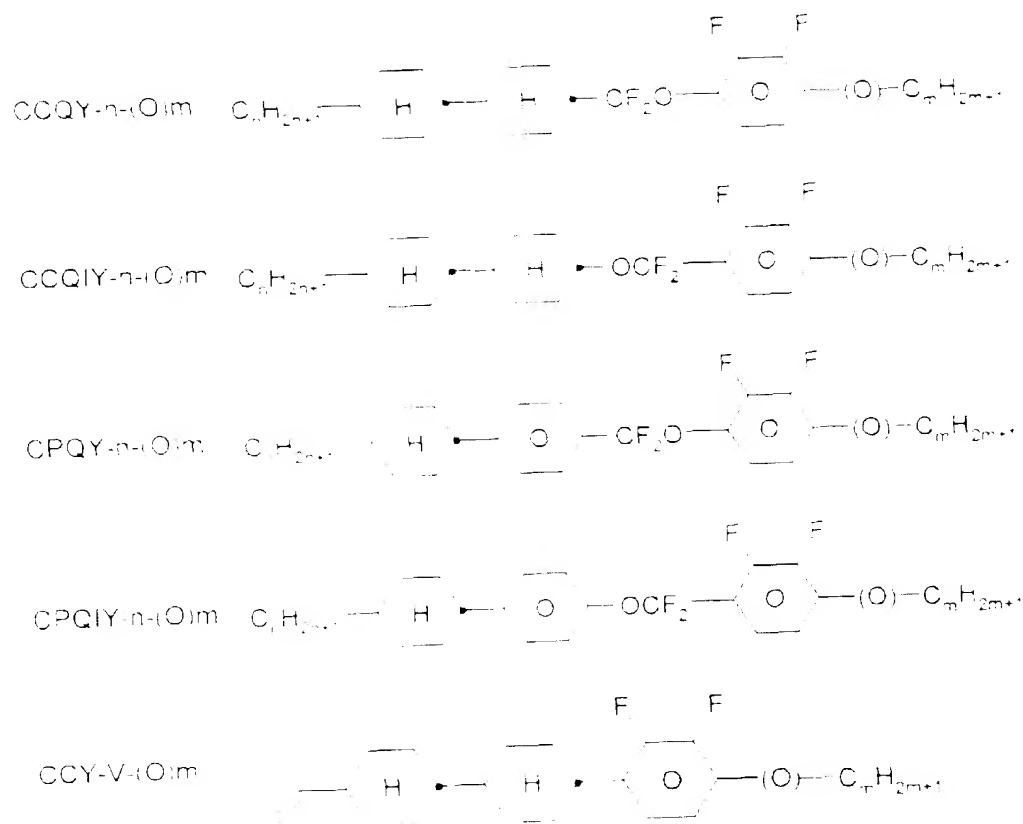


CCY-n-Om



CCY-n-Om





The abbreviations furthermore have the following meanings:

m = number of repeating units of the alkyl chain

Δn = optical anisotropy measured at 25°C and 488 nm

Δn_{max} = maximum optical anisotropy at 25°C and 488 nm

η_{sp}/c = specific viscosity

η_{sp}/c = specific viscosity measured at 25°C and 488 nm

η_{sp}/c = specific viscosity at 25°C

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Figure 1 consists of two schematic diagrams, (a) and (b), representing the experimental design. Diagram (a) is a 2x2 factorial design. The vertical axis is labeled 'Pretest' with 'Yes' at the top and 'No' at the bottom. The horizontal axis is labeled 'Condition' with 'Control' on the left and 'Experimental' on the right. Diagram (b) is a 2x2x2 factorial design. The vertical axis is labeled 'Pretest' with 'Yes' at the top and 'No' at the bottom. The horizontal axis is labeled 'Condition' with 'Control' on the left and 'Experimental' on the right. A vertical line represents the 'Time' axis, with 'Before' at the top and 'After' at the bottom. The design shows the interaction between these factors across the experimental timeline.

Introduction

10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 8

Example 1-4

| | | | |
|-----------|-----|-----------------------|------------|
| PCN-1-APP | 13. | 8.0 + 11.0 | 8.0 + 11.0 |
| PCN-2-APP | 14. | Flowing; not used | Flowing |
| PCN-3-APP | 15. | Amorphous, not used | Amorphous |
| PCN-4-APP | 16. | Amorphous, not used | Amorphous |
| PCN-5-APP | 17. | 8.0 + 11.0 mm, 11.0 g | 8.0 + 11.0 |
| PCN-6 | 18. | 7.0 + 11.0 mm, 11.0 g | 7.0 + 11.0 |
| PCN-7 | 19. | Flowing | Flowing |
| PCN-8 | 20. | Flowing | Flowing |
| PCN-9 | 21. | Flowing | Flowing |
| PCN-10 | 22. | Flowing | Flowing |

Example 1-5

| | | | |
|-----------|-----|-----------------------|------------|
| PCN-1-APP | 11. | 8.0 + 11.0 | 8.0 + 11.0 |
| PCN-2-APP | 12. | Flowing; not used | Flowing |
| PCN-3 | 13. | Amorphous, not used | Amorphous |
| PCN-4 | 14. | Amorphous, not used | Amorphous |
| PCN-5 | 15. | 8.0 + 11.0 mm, 11.0 g | 8.0 + 11.0 |
| PCN-6 | 16. | 7.0 + 11.0 mm, 11.0 g | 7.0 + 11.0 |
| PCN-7 | 17. | Flowing | Flowing |
| PCN-8 | 18. | Flowing | Flowing |
| PCN-9 | 19. | Flowing | Flowing |
| PCN-10 | 20. | Flowing | Flowing |

Example 1-6

| | | | |
|-----------|-----|-----------------------|------------|
| PCN-1-APP | 13. | 8.0 + 11.0 | 8.0 + 11.0 |
| PCN-2-APP | 14. | Flowing; not used | Flowing |
| PCN-3 | 15. | Amorphous, not used | Amorphous |
| PCN-4 | 16. | Amorphous, not used | Amorphous |
| PCN-5 | 17. | 8.0 + 11.0 mm, 11.0 g | 8.0 + 11.0 |
| PCN-6 | 18. | 7.0 + 11.0 mm, 11.0 g | 7.0 + 11.0 |
| PCN-7 | 19. | Flowing | Flowing |
| PCN-8 | 20. | Flowing | Flowing |
| PCN-9 | 21. | Flowing | Flowing |
| PCN-10 | 22. | Flowing | Flowing |

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1. *Phragmites* spp. (Poaceae)

1. *Journal of the American Medical Association*, 1997; 277: 1033-1038.

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1. *Journal of the American Medical Association*, 1997; 277: 1039-1043.

Abstract

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Example 16

| | | | |
|------------|-------|---------------------------|---------|
| PCN = 4FF | 10.10 | Clearing point (°C): | 70.5 |
| PCN = 4FF | 10.10 | Δn (°C mm, 1.01): | 0.00004 |
| PCN = 4FF | 10.10 | Δn (1 kHz, 1.01): | 0.00 |
| CPY = 1.0 | 10.10 | ϵ (1 kHz, 1.01): | 3.0 |
| CPYT = 3.0 | 10.10 | γ (Hz): | 0.00 |
| CPYT = 3.0 | 10.10 | γ (mPa-s, 1.01): | 0.0 |
| CPY = 1.0 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |

Example 17

| | | | |
|------------|-------|---------------------------|---------|
| PCN = 4FF | 10.10 | Clearing point (°C): | 70.5 |
| PCN = 4FF | 10.10 | Δn (°C mm, 1.01): | 0.00004 |
| PCN = 4FF | 10.10 | Δn (1 kHz, 1.01): | 0.00 |
| CPY = 1.0 | 10.10 | ϵ (1 kHz, 1.01): | 3.0 |
| CPYT = 3.0 | 10.10 | γ (Hz): | 0.00 |
| CPYT = 3.0 | 10.10 | γ (mPa-s, 1.01): | 0.0 |
| CPY = 1.0 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |

Example 18

| | | | |
|------------|-------|---------------------------|---------|
| PCN = 4FF | 10.10 | Clearing point (°C): | 70.5 |
| PCN = 4FF | 10.10 | Δn (°C mm, 1.01): | 0.00004 |
| PCN = 4FF | 10.10 | Δn (1 kHz, 1.01): | 0.00 |
| CPY = 1.0 | 10.10 | ϵ (1 kHz, 1.01): | 3.0 |
| CPYT = 3.0 | 10.10 | γ (Hz): | 0.00 |
| CPYT = 3.0 | 10.10 | γ (mPa-s, 1.01): | 0.0 |
| CPY = 1.0 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |
| PCN = 10 | 10.10 | | |

Example 1

| | | | |
|-----------|------|----------------------|---------|
| PCH-1.4FF | 11.7 | Clearing point (°C): | 77.6 |
| PCH-1.6FF | 11.1 | An (1550 nm, 20 °C): | +1.0502 |
| PCH-1.4FF | 11.1 | Ac (1 KHz, 20 °C): | +3.7 |
| CPQV-3-11 | 5.1 | e (1 KHz, 20 °C): | 3.6 |
| IPP-1-14 | 11.7 | " (10): | 1.14 |
| IPP-1-11 | 11.7 | γ (mpa·m, 20 °C): | 11.7 |
| CPQV-11 | 5.1 | | |
| CP-1-11 | 5.1 | | |
| CPH-11 | 5.1 | | |
| CCQV-11 | 11.7 | | |

Example 2

| | | | |
|-----------|------|----------------------|---------|
| PCH-1.4FF | 11.7 | Clearing point (°C): | 77.6 |
| PCH-1.6FF | 11.1 | An (1550 nm, 20 °C): | +1.0502 |
| PCH-1.4FF | 11.1 | Ac (1 KHz, 20 °C): | +3.7 |
| CCQV-3-11 | 5.1 | e (1 KHz, 20 °C): | 3.6 |
| IPP-1-14 | 11.7 | " (10): | 1.14 |
| IPP-1-11 | 11.7 | γ (mpa·m, 20 °C): | 11.7 |
| CPQV-11 | 5.1 | | |
| CP-1-11 | 5.1 | | |
| CPH-11 | 5.1 | | |
| CCQV-11 | 11.7 | | |